C40 CLEAN AIR CITIES DECLARATION:

How cities are cleaning the air we breathe

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C40 CITIES

ACKNOWLEDGEMENTS

This report was created in collaboration with each of the signatory cities of the C40 Clean Air Cities Declaration. Each city section including the summary and the city resident impact stories were self-reported. The city summaries showcase past, present, and future actions the city is implementing to achieve the goals of the declaration. The delivery of the Clean Air Cities Declaration and this report has been possible thanks to the support of the Clean Air Fund. For further information on the C40 Clean Air Cities Declaration, please check out the declaration webpage.

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FOREWORD

Many cities are among those on the frontline of climate change, feeling the impacts of record-breaking temperatures, rising sea levels, and climate related natural disasters.

Since 2017, C40's Declarations and statements of political leadership – based on the toughest science-based targets and allied to concrete delivery milestones – have been signed by bold and forward-thinking Mayors. These reports document the ambitious action that has been implemented within cities. The importance of acting now is greater than ever. Focusing on achieving carbon neutrality by 2050 gives people a false sense of the time we have left to solve the climate crisis, and these Mayors have acknowledged that when it comes to creating safe, inclusive, resilient cities we must act now.

Despite the many challenges faced in recent times, with the global pandemic, economic disruption and upheaval, climate related natural disasters and in many cases strained financial resources, C40 cities have continued to act and have more than doubled the number of high-impact climate actions implemented in the six years since the Paris Agreement was signed. Cities have also already delivered more than 270 actions and are on track to deliver more than 900 additional actions by 2030, creating urban environments that allow citizens to thrive through creating streets that put people first, cleaning the air that people breathe, creating low-cost and energy efficient homes and offices, ensuring citizens have access to balanced and nutritious food that does not harm the planet and advancing towards zero waste policies.

This must be a decade of action, with cities accelerating their efforts to tackle greenhouse gas emissions. For that reason, I have brought my own commitment to making London net zero forward by 20 years to 2030. I have also recently set out my preferred pathway to 2030 and identified further bold actions that London will need to take to achieve this goal. Delivery will require action by many stakeholders, but by setting out a bold and ambitious approach of our own we can encourage others to follow our example.

Congratulations to the cities featured in these reports for their leadership in creating **The Future We Want**, by demonstrating that their commitments are not empty words, but bold actions, and for driving the change needed for a safe planet for future generations.

Sadiq Khan
Mayor of London and Chair of C40 Cities

INTRODUCTION

Nine out of 10 people around the world are breathing dirty air. Not only does this lead to premature deaths and increased disease, but also it negatively impacts our economies and reduces opportunities for people to thrive. It is often the poorest and most vulnerable communities in our cities that are most at risk from the impacts of dirty air.

We also know that tackling air pollution and the climate crisis go hand-in-hand. Both need swift, unprecedented and collective action to remove the pollution that is harming our health and warming our planet.

To address this, 37 mayors have pledged to deliver clean air in their cities, which will improve air quality for over 140 million people. By signing the C40 Clean Air Cities Declaration, mayors recognised that breathing clean air is a human right and are now working together in an unparalleled global coalition for clean air. Mayors are using their power and influence to reduce air pollution and work towards meeting the World Health Organisation's (WHO) Air Quality Guidelines.

To clean the air that people breathe in cities, help meet the goals of the Paris Agreement and WHO Air Quality Guidelines, signatories of this declaration pledge to:

- **Within two years, establish baseline levels and set ambitious reduction targets for air pollutants that meet or exceed national commitments. These targets will put cities on a path towards meeting World Health Organisation Air Quality Guidelines for particulate matter, nitrogen dioxide, ozone, and sulphur dioxide.**

- **Before 2025 or within 5 years of joining this commitment, implement new substantive policies and programmes to address the top causes of air pollution emissions within cities and under their control.**

In #TheFutureWeWant, all people, no matter where they live, can breathe clean air freely. This report outlines the actions that cities have taken to deliver on the Clean Air Cities Declaration.

C40 CITY SIGNATORIES

Amman
Austin
Barcelona
Bengaluru
Berlin
Bogotá
Buenos Aires
Ciudad de México
Copenhagen
Delhi
Dubai
Durban (eThekwini)
Guadalajara
Heidelberg
Houston
Jakarta
Lima
Lisbon
London
Los Angeles
Madrid
Medellín
Milan
Oslo
Paris
Portland
Quezon City
Quito
Rio de Janeiro
Rotterdam
Seoul
Stockholm
Sydney
Tel Aviv - Yafo
Tokyo
Warsaw
Washington DC

EXECUTIVE SUMMARY

Since October 2019, 37 mayors have signed the C40 Clean Air Cities Declaration, pledging to make their cities cleaner and healthier for their residents.

Exposure to air pollution causes severe health impacts, making it the single largest environmental threat to human health. The C40 Clean Air Cities Declaration aligned its goals with the World Health Organisation (WHO) guidelines for outdoor (ambient) air pollution levels which provide an evidenced, health-based reference tool for policy-makers to use in setting standards and goals as part of local air quality management. In 2021, the WHO updated its guidelines, where across nearly all pollutants, recommended levels are lower than the previous 2005 guidelines. The 2021 update reflects far-reaching evidence on how air pollution affects many aspects of health, even at low levels.

The COVID-19 pandemic has highlighted the important role of cities in delivering actions to ensure healthy and safe environments. C40 cities are leading the way in delivering a green and just recovery that is aligned with the principles of a Global Green New Deal and that rebuilds cities and economies in a way that improves public health, reduces inequality and addresses the climate crisis. Due to COVID-19 restrictions, cities experienced how activity changes in sources of pollution affected their local air quality, providing valuable information to policymakers moving forward.

C40 Clean Air Cities Declaration signatories are taking evidence-based action and implementing transformational changes such as expanding their air quality monitoring networks to collect, analyse and communicate data about the air we breathe and the health impacts of air pollution. Robust air quality data sets like these are essential in helping policymakers identify sources of pollution, raising awareness, evaluating risk, developing and implementing policies, and tracking progress.

Cities are also taking steps to protect the health and well-being of residents by giving public space back to people and nature by reclaiming streets to create more liveable communities. Across the C40 network, mayors are implementing policies that make it easier and safer to walk and cycle, expand public transport, implement zero emission zones and encourage people to leave their polluting vehicles behind. Urban planning policies are better connecting residents to their jobs, schools, leisure, and their loved ones, while air quality is improved by facilitating sustainable transport options.

The use of polluting fuels for heating, cooking and generating energy in buildings and infrastructure, and the activities involved in the construction and demolition of those, are a considerable source of air pollution and greenhouse gas (GHGs) emissions in cities. To address these sources, signatory cities have been expanding the deployment of renewable energy infrastructure, working towards achieving universal access to reliable, sustainable and affordable electricity and increasing the use of cleaner fuels for cooking and heating to improve indoor and outdoor air quality.

Climate and air quality action in cities can also enhance social equity, providing multiple benefits for city residents. In delivering their C40 Clean Air Cities Declaration commitments, several cities have implemented activities to assess the positive or negative impacts of their actions on city residents, in order to inform the ways in which to deliver them equitably. Activities include analysing actions for benefits or impacts among vulnerable populations or historically disadvantaged residents, to ensure benefits are maximized and disparities are reduced, or taking a participatory approach to policy implementation, to ensure all voices are heard in the policy-making process.

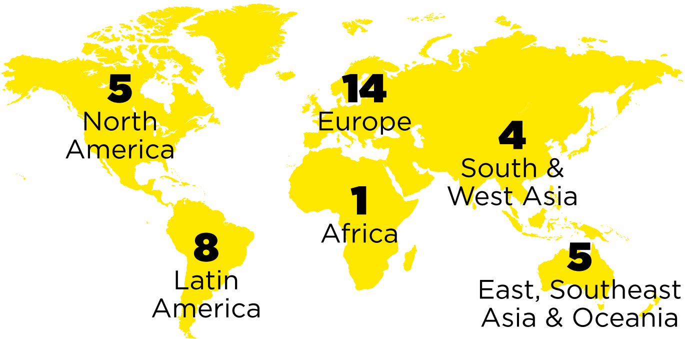
DATA ANALYSIS

Total number of signatory cities

37

Cities have committed to the
Clean Air Cities Declaration

Number of signatory cities by region



COMMITMENT 1:

Within two years, establish baseline levels and set ambitious reduction targets for air pollutants that meet or exceed national commitments. These targets will put signatory cities on a path towards meeting World Health Organisation Air Quality Guidelines for particulate matter, nitrogen dioxide, ozone, and sulphur dioxide.

In order to achieve the goals of the C40 Clean Air Cities Declaration, signatory cities pledged to deliver over 130 city-specific actions under the first commitment. These actions are mainly targeted towards expanding air quality monitoring networks to understand pollution levels and set air quality targets in line with the World Health Organisation (WHO) guidelines for outdoor (ambient) air pollution levels.

During the last 2 years, **23 signatory cities have expanded their monitoring networks**, continuing their efforts to increase the availability of accurate and reliable data on pollution levels. Cities are also creating and updating emissions inventories and source apportionment studies to better understand where and how outdoor air pollution is formed, to inform plans to tackle these main sources of emissions.

Cites have been setting air quality goals in line with WHO guidelines and creating a framework for evaluating progress on air quality. Cities are taking context-specific approaches to setting their targets; some cities integrate targets into Air Quality Management Plans and Climate Actions Plans, others have pursued regulations to incorporate air quality targets into legal frameworks, while others are adopting regional and national regulations.

COMMITMENT 2:

Before 2025 or within 5 years of joining this commitment, implement new substantive policies and programmes to address the top causes of air pollution emissions within our city and under our control.

To tackle the main sources of air pollution in their cities, signatories pledged to deliver over 360 actions under the second commitment of the Clean Air Cities Declaration. From those actions **63% are currently on track to be delivered and 15% have been achieved**. Through these actions cities are tackling emissions in several sectors; with 62% of actions included in Commitment 2 focusing on transportation, 15% on clean energy and building related emissions, and a number of actions to reduce emissions from industrial activities, waste sector, and expand greening in cities to not only reducing emissions but also to adapt to the impacts of climate change.

Actions By Sector

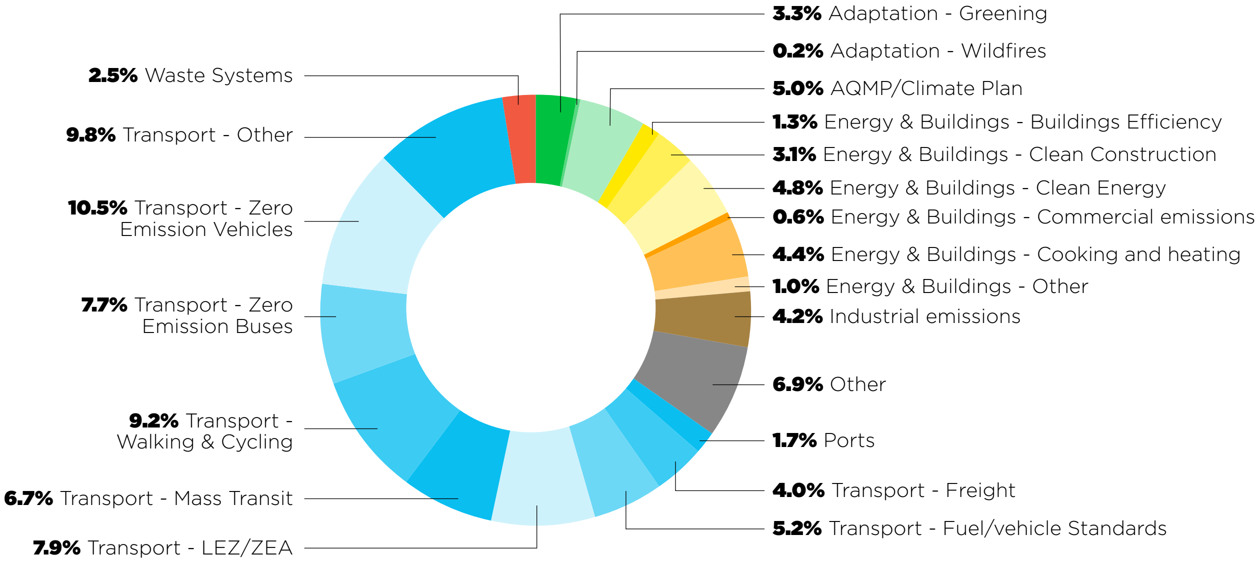


FIGURE 1: This diagram shows the sectors in which signatory cities have pledged to deliver action under commitment 2. For instance, around 9% of actions are focusing on Walking and Cycling.

Actions Status

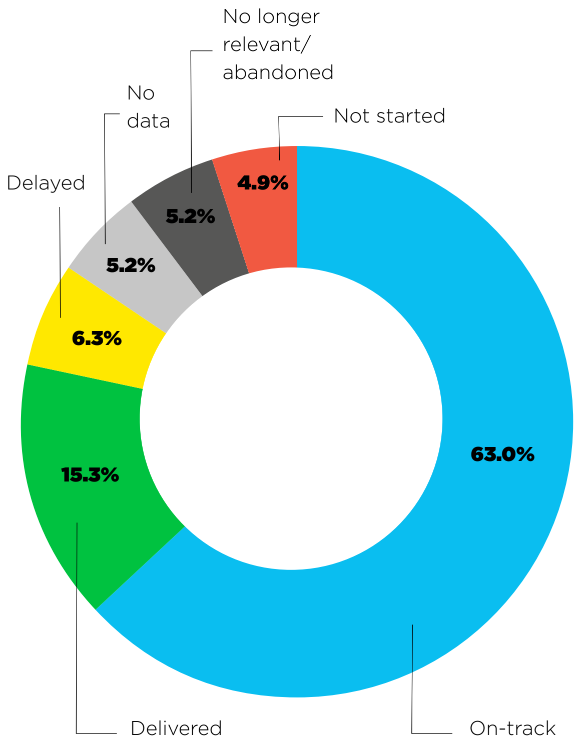


FIGURE 2: This diagram shows the delivery status of Clean Air Cities Declaration actions under commitment 2.

Some examples of the cities advancing action in these sectors are:

- 25 signatory cities are taking action to promote active mobility by improving and deploying walking and cycling infrastructure, such as Barcelona, Berlin, Lima and Quezon City;
- 20 cities are improving and expanding mass transit, such as Amman, Copenhagen, Tel Aviv-Yafo and Warsaw;
- 16 signatories are implementing actions linked to the deployment or expansion of Low Emission Zones or Zero Emission Areas, such as Durban, London, Los Angeles and Milan;
- 28 cities are working on transitioning from internal combustion engine vehicles to zero emission ones, such as Delhi, London, Los Angeles and Guadalajara;
- 6 cites are addressing pollution from the waste sector, such as Amman, Bengaluru and Stockholm;
- 10 cities are addressing pollution from the industrial sector, such as Barcelona, Durban and Delhi;
- 9 cities are working on promoting and expanding clean energy use and production, such as Austin, Madrid, Jakarta and Warsaw.

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CITY PROGRESS SUMMARIES

The following section of this report contains progress and action summaries that were self-reported by each of the C40 Clean Air Cities Declaration signatory cities. The city summaries showcase past, present, and future actions the city is undertaking to achieve the implementation milestones of the Declaration.

AMMAN

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The city of Amman is committing to increase its air quality monitoring, and Amman currently has seven stations within the Greater Amman Municipality (GAM) borders. The city also intends to create a comprehensive data centre, which will include its newly collected air quality data.

Amman will use emissions inventories by monitoring data and relationships with relevant government agencies including the Ministry of Environment and the Royal Scientific Society, to identify the top causes of air pollution and target new policies and initiatives.

Amman is working to launch a Bus Rapid Transit (BRT) network with the delivery of a soft trial operation for the first bus line. The city is also planning to develop a transport mobility plan; expanding walkability, particularly in areas near stations to increase accessibility and reduce private vehicle usage; introducing 286 buses with eco-friendly engines; improving the walkability of areas around the BRT corridors; and improving transportation mobility planning to account for air quality and sustainable development, through the development of a transport mobility plan.

GAM is planning to develop the Amman Bus Project, which is a public transport operation project within the city of Amman. The project, which includes the operation of new diesel and electric buses in the city, will improve the reliability, safety, and quality of public transport services for users, as well as improve air quality through reduced carbon emissions and better fuel efficiency. These measures are in compliance with objectives and commitments of the city. The investment in the new buses will result in a significant reduction in emissions (clean air and greenhouse gas (GHG) related) from the urban bus sector.

GAM intends to purchase new 136 Euro V diesel buses and 15 battery electrical buses and develop a ticketing system and real-time information system integrated with the existing systems. However, they will have some improvements including the availability of the operation schedule and route announced through the Amman Bus mobile application

GAM is also increasing the awareness and policies regarding Environmental and social impacts in its solid waste management. For instance, fleet purchasing is following the new Euro V and Euro IV eco-friendly engines for the solid waste management large trucks, refuse collection vehicles, and a pilot of e-trolleys for collection in narrow streets. The city is also constructing a new maintenance workshop in Ghabawi Landfill to reduce the emissions due to travel between the city and the landfill. Some measures the city is taking include monitoring and controlling the emissions from the Biogas to the Energy system, restricting smoking areas, and introducing other safety procedures.

AMMAN

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GAM is going to rehabilitate and expand the Shaer Waste Transfer station next year by adding two new closed systems with controlled air filtration, preventing odours, deleting the emergency open dump area, and providing a new stormwater and closed leachate collection system to prevent odours and improve air quality.

Additional plans include implementing policies that will increase across the city green space from 1.6% to 2.5% by planting more than 7,000 dunums as new green land. This will increase the percentage of green area per capita from 3.18 m^2 in 2021 to 4.30 m^2 by 2026. However, the success of this plan depends on the availability of funds and empty land. The city is also creating an incentive programme for industrial projects that implement environmentally friendly systems. This includes improving efficiency and reducing emissions from waste management; and creating a National Waste Information and Monitoring System in cooperation with the Ministry of Environment.

The Urban Micro-Lungs Initiative

The Urban Micro-Lungs Initiative is a green infrastructure intervention executed by the project Improving Living Conditions in Disadvantaged Areas in Amman. It is funded by the German Federal Ministry for Economic Development and Cooperation and implemented by the German Agency for International Cooperation (GIZ) in partnership with the Jordanian Ministry of Environment and Greater Amman Municipality. The initiative is being implemented with the technical expertise of the Tayyun Research Studio using the Miyawaki method, and aims at establishing two urban micro-forests in the densely populated area of East Amman. These micro-forests provide various environmental benefits by improving air quality, providing shade and reducing water runoff. The careful selection of plant species, based on the habitat of the area, also ensures that they are drought tolerant and require little maintenance.

In Solid Waste Management, the new fleet purchasing has followed the new eco-friendly engines Euro V and Euro IV specifications in (2018); dump trucks, refuse collection vehicles, roll-on roll-off, skip loaders, busses, water tanks, and wheeled loaders (101 vehicles In total) and will continue to commit to the eco-friendly specifications in future.

AUSTIN

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The city of Austin has worked to establish baseline levels and set ambitious reduction targets. The city has continued collaboration on air pollution mitigation with regional partners via its participation in the Clean Air Coalition and an interlocal agreement with the Capital Area Council of Governments. In late 2020, the Clean Air Coalition voted to participate in the Environmental Protection Agency's PM Advance Program, which will expand the focus of Austin's local air quality work from focusing on NOX and ground-level ozone, to also include $PM_{2.5}$ (particulate matter) emissions.

This is complemented by efforts to better examine causes of particulate matter (PM) pollution by expanding localised PM monitoring in the area. CAPCOG (the Capital Area Council of Governments) will deploy additional $PM_{2.5}$ sensors in the region, and the city is collaborating with local education and non-profit organisations to deploy additional low-cost sensors with priority deployment for low-income and BIPOC communities and historically industrialised regions.

In September 2020, Austin set two ambitious targets for air quality as part of the city's Strategic Direction 2023 Initiative: 1) 365 days per year of good air quality and 2) zero days per year in which ground level ozone concentration exceeds EPA standards.

The city has rolled out new substantive policies and programmes to address the top causes of air pollution. The Austin Climate Equity Plan, which includes energy, transportation and natural systems measures that will mitigate local air pollution, was approved in September 2021. In May 2021, the City Council passed a resolution to participate in PM-specific reduction measures, including some of the largest sources of emissions such as construction and road dust.

In November 2020, Austin voters approved two mobility bonds: Project Connect, which will expand the capacity of public transit, and a second proposition to expand walking and cycling. In early 2020, as part of the update to the Austin Energy Resource, Generation and Climate Protection Plan, the utility committed to 86% of its electricity generation being carbon-free by year-end 2025; 93% carbon-free by year-end 2030; and all generation resources carbon-free by 2035.

As part of cross-departmental climate resilience activities, the city is collaborating with the Austin Fire Department on wildfire mitigation policies. Finally, Austin also continues with implementation of ground-level ozone reduction measures, including continuing city-fleet electrification.

AUSTIN

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Austin is delivering on the C40 Equity Pledge commitment by reporting equity and inclusion considerations in its climate actions

In addition to evaluating the goals and strategies in the Austin Climate Equity Plan based on their ability to negatively or positively impact health and the quality of life of communities of colour and low-income communities, the city has also carried out equity assessments for actions within its Clean Air Declaration. Some key findings have included revealing the health advantages that can be key drivers of climate action and the importance of being intentionally equitable in outreach, education and workforce development in order to have the largest beneficial impacts on low-income communities and communities of colour.

Additionally, this effort revealed key areas that the city can focus on to strengthen its inclusive climate action work, such as the importance of streamlining data collection processes and inclusive/accessible feedback mechanisms for community input and accountability; breaking silos across programmes and initiatives; and identifying dedicated funding to ensure that the implementation of equitable strategies is successful. These findings demonstrate the city's leadership in evaluating its equitable and inclusive impact and showcase the important potential that the city has to deliver ambitious inclusive and equitable climate action.

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BARCELONA

Barcelona has made significant progress on the declaration's commitments since signing the C40 Clean Air Cities Declaration in 2019. Barcelona had already established reference levels for the different pollutants, which appear in a directive dated May 2008, and also had ambitious objectives for the reduction of atmospheric pollutants to comply with the limits established by European regulations, as well as the air quality guidelines of the World Health Organisation for all atmospheric pollutants.

Barcelona currently has a network of 11 monitoring stations across the city. A number of studies are being carried out to improve knowledge and several pilot tests are being conducted with air quality sensors. Information is available to the public on air quality at street level, for NO_2, PM_{10} and $PM_{2.5}$ pollutants.

In recent years, Barcelona has promoted an ambitious strategy to combat atmospheric pollution, as well as bringing about a modal change in the population's mobility habits and reducing the volume of traffic in the city, one of the highest in Europe. The measures have focused on the main contributing source, road traffic (approximately 60% of total emissions), without forgetting other important sources such as industry, ports, airports, and so on.

In January 2020, the Barcelona low emission zone was put into operation, covering an area of 95 km^2 and five different municipalities.

Work is underway to create low-traffic streets in the city (pacification), which will reduce the space allocated to private transport and grant it to pedestrians and other more sustainable forms of mobility. The Superblocks project (see map), which aims at reclaiming space from cars for city residents, has a new approach based on the establishment of 'green and civic axes', and will focus on creating low-traffic streets around circulatory axes in the Eixample district, the most polluted in the city.

Finally, parking regulations are being reviewed and revised to discourage the use of private transport in favour of public transport.

Barcelona is delivering on the C40 Equity Pledge commitment by reporting equity and inclusion considerations in its climate actions

Barcelona carried out a participatory process to help define its low emission zones, with sessions distributed throughout all districts of the city allowing the population to give their opinion and request changes in the drafted design. This process was key to defining the critical aspects of the municipal policy that address accessibility needs for different members of the community, including people with reduced mobility and local businesses, while also being adapted to the needs of the COVID-19 context. Concrete examples include the accessibility of low-income, self-employed individuals to continue using their vehicles on a temporary basis, thus giving them more time to replace their vehicles.

BENGALURU

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Since signing the C40 Clean Air Cities Declaration in 2019, the city of Bengaluru (Bruhat Bengaluru Mahanagara Palike or BBMP) has undertaken the first stages of roadmap development to establish baseline levels and drafted ambitious reduction targets consistent with achieving World Health Organisation guidelines.

After analysing air quality levels, the city established that the average annual air quality index values improved from the moderate category (101–200) to satisfactory (51–100) between 2014 and 2019. Furthermore, annual average PM_{10} (particulate matter) values have shown a 28% decreasing trend compared to 2014–2015. Lastly, between 2014 and 2019, average annual $PM_{2.5}$ values decreased by 29% compared to 2015–2016.

The city is rolling out new substantive policies and programmes to address the sources and causes of air pollution. The Karnataka State Pollution Control Board, in collaboration with the administrative board of BBMP and other key stakeholders, has prepared the Action Plan for Control of Air Pollution for the city. The Clean Air Action Plan for Bengaluru defines clear outputs linked to identified projects for implementation that will help in the overall improvement of air quality. The BBMP is also preparing a Climate Action Plan for Bengaluru that will integrate air quality measures.

The city has set up 7 Continuous Ambient-Air-Quality Monitoring Stations (CAAQMS) and 13 manual air quality monitoring stations across Bengaluru, which monitor air quality in real time and share the information with the public. BBMP is also in the process of setting up 4 new CAAQMS and linking it to the Central Command and Control Centre of KSPCB in Bengaluru. Other actions the city has in progress to support waste management include the deployment of mechanical sweepers to remove dust on roads; an action plan to fill potholes and rectifying road cuttings to ensure smooth flow of traffic; construction and demolition (C&D) waste removal from public spaces, and enforcement to check C&D waste related pollution and a facility for re-processing construction and demolition waste; the reduction of road dust by sprinkling treated water from the Bangalore Water Supply and Sewerage Board over roads; the procurement of outdoor display system for citizen awareness; the procurement of smog free tower, the use noise meters; the use of artificial intelligence for checking of vehicular emission; the identification of Garbage Vulnerable Points (GVPs); the monitoring of industrial areas, biomedical areas and creation of monitoring and surveillance grid system using sensors and smart devices for control of open areas susceptible for garbage burning and control measure; and conducting information exchange capacity building and educating the citizens.

BENGALURU

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Other initiatives include greening of urban spaces, plantation drive and water fountains at traffic junctions.

Recently, the Department of Urban Land Transport (DULT) implemented a clean air initiative for Church Street (Central Business District) with support from Innovate UK. The initiative included the pedestrianisation of Church Street during weekends along with monitoring air quality levels and person footfalls in the area. A study by the Indian Institute of Science (IISC) showed drastic improvements in the overall air quality in and around Church Street when it was pedestrianised. Similar initiatives are being planned for other streets in Bengaluru.

Lastly, the city is implementing a ban on burning solid waste in public. The city is also creating a separate space to handle different kinds of waste in all wards, planting trees in public places and green open areas in new Bengaluru Development Authority (BDA) layouts and planting specific native species that can absorb fine dust from the air.

BERLIN

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Since signing the C40 Clean Air Cities Declaration in 2019, Berlin has taken bold steps towards achieving the two main commitments.

Berlin expanded its air quality monitoring network with 16 new passive sampler sites for NO_2, 11 new automatic monitors for simultaneous measurements of PM_{10} and $PM_{2.5}$ and a new automatic high quality station for NO_2, PM_{10} and $PM_{2.5}$ at the pollution hot spot.

In summer 2019, the city adopted a major update (the 2nd revision) of its Air Quality Plan (AQP) with new air quality targets for NO_2, PM_{10} and $PM_{2.5}$ aligned with World Health Organisation (WHO) guidelines.

Since signing the declaration, Berlin has already implemented several of the AQP abatement measures. This includes the introduction of speed limits of 30 km/h and driving bans in polluted roads for diesel vehicles that do not meet the EU emission standard Euro VI. The city has also carried out the retrofit of SCR-catalysts to heavy municipal vehicles and buses; an accelerated substitution by new Euro VI vehicles or electric buses; heavy investments in better cycling infrastructure; and an expansion of the metro and tram network. As a result, Berlin managed to substantially reduce NO_2 to WHO guideline levels, even taking the COVID-19 restrictions into account.

Several measures in the new AQP were also designed to reduce PM emissions even though the EU limit values for particulate matter have already been attained. In preparation to sign C40's Clean Air Cities Declaration, Berlin was the first German city to commit to developing an integrated air quality strategy with the updated Air Quality Plan. In doing so, Berlin will maximize the synergies with its climate and mobility policy. Berlin will start modelling emission reduction scenarios as a first step to develop the city's air quality strategy and aims to make a bold move towards achieving the WHO guidelines by 2030.

Berlin's cycling citizens' movement: 'Changing Cities'

Berlin's new mobility act was elaborated in collaboration with civil society. A public referendum was initiated as a result of city residents' work led by a movement of cyclists, named 'Changing Cities'. This citizen's movement pledged to develop and adopt a bicycle law, which should define the quality criteria of a safe and attractive cycling infrastructure, set out a roadmap for its implementation and allocate the requisite financial and staff resources. Given the success of the initiative in the first phase of the referendum and the very supportive response from the media and the public, the initiative had a strong impact on political parties' election manifestos.

This venture by city residents led to the idea of legally enshrining the conditions for an attractive and safe cycling infrastructure in a new law. After the election, this suggestion found its way into the government programme of the elected Senate. It pledged to develop a new mobility law with a wider scope covering also public transport, pedestrian traffic, commercial traffic and new forms of mobility.

In 2020, the Mobility Act paved the way to re-distribute the available road space for the benefit of cyclists, for instance by rapidly setting up 25 km of provisional pop-up bike-lanes, most of which are now permanently installed.

BOGOTÁ

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The District Secretariat of Environment outlined Bogotá's new management strategy in the Strategic Air Quality Plan – Air Plan 2030. It was adopted by the Distrital Decree in 2021 to reduce the impact on citizen's health and associated costs of healthcare and to achieve the third objective of the World Health Organisation.

Since 2008, Bogotá has seen a reduction of diseases associated with pollution and a 20% reduction of Particulate Matter concentration (PDDAB, 2020). The air quality protection policy in the city has expanded and been enforced, making air quality a responsibility of all city residents. Bogotá is committed to the World Health Organisation's air quality objectives. Through the Air Quality Plan, 45 projects have been established aiming to reduce air pollutants. Bogotá has established a public information system informed by national monitoring programs and air quality forecasts, citizen science initiatives and through periodic air quality reports and real time reporting of air quality data. The AQ plan has a strong follow-up system, based on the data reported by the Air Quality Monitoring Network, the Atmospheric Modelling System and the annual emissions inventories of criteria air pollutants.

In Bogotá, there is a growing consensus among local environmental and mobility authorities to define measures to promote clean freight transport and sustainable mobility technologies. The participation of multilateral organisations has increased, helping to harmonize efforts to improve air quality and protect vulnerable people, recognize not only the common causes of both problems, but also create synergies to build solutions. An example of this is the project named PIZSO (South west intervention Plan).

BUENOS AIRES

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Since signing the C40 Clean Air Cities Declaration in 2019, Buenos Aires has embarked on a journey towards establishing better air quality policies.

As a starting point, a modification of the admissible limits for criteria pollutants was approved by resolution, which in turn makes into law the progressive reduction of admissible levels, proposing five stages of consecutive compliance to achieve World Health Organisation (WHO) guideline levels.

Alongside this, the city launched a plan to improve and expand its air monitoring network during 2021. This plan calls for the renovation, adaptation and sharing of instruments during 2021–2023 to measure all criteria pollutants at the city's four stations, and then continuing to expand the network by adding new monitoring points.

This consolidation of the air quality monitoring network will allow Buenos Aires to provide solid, accurate and reliable data to compile a more complete diagnosis of the air quality conditions in the city, which will allow it to establish air pollution reduction objectives aligned with WHO guidelines.

At present, the city is forming a commission of experts to implement coordinated actions across multiple levels of government. This commission will work to reduce emissions from major sources of air pollution, evaluate the impact of these emissions on health, and establish deadlines for the implementation of the last stages of the resolution.

Buenos Aires is delivering on the C40 Equity Pledge commitment by reporting equity and inclusion considerations in its climate actions

In the delivery of the C40 Clean Air Cities Declaration, the city is expanding its public bicycle network to all neighbourhoods of the city and promoting the use of bicycles as outlined in its Climate Action Plan. The city has programmes that can provide financial incentives for the purchase of bicycles, among others

A key finding from a co-benefit analysis carried out also showed that only 26% of bicycle users in the city are women. People with disabilities and elderly citizens may not benefit from the bike network due to mobility limitations that inhibit their use of bicycles. With these findings, the city can now consider these potential negatively impacted groups in the design and implementation of its bicycle lane network. One consideration will be enhancing safety, since a marked difference was observed in the use by women of bicycle lanes when they featured the physical separation of vehicular flows.

CIUDAD DE MÉXICO

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One of the priorities of Ciudad de México is to guarantee better air quality to its residents. As such, it has launched programmes that will serve different sectors identified as main emitters of pollutants.

It will soon be publishing the Management Program to Improve Air Quality in the Metropolitan Area of the Valley of Mexico 2021–2030, which will contain measures to serve highly polluting sectors, as well as supporting actions to improve air quality for a period of 10 years. The programme establishes actions that will reduce air pollutants, which will make it possible to comply with national standards and progressively advance towards the objectives of the World Health Organisation.

In conjunction with other institutions, Ciudad de México is working on updating the official Mexican standards on environmental health related to the maximum concentration of ozone, particles, nitrogen dioxide and carbon monoxide.

The Ciudad de México Climate Action Program (PACCM) 2021–2030 and the Local Climate Action Strategy 2021–2050 are current tools committed to addressing the climate emergency in Ciudad de México. These documents present ambitious climate policies that facilitate emissions reduction and assist in curbing the negative impacts of climate change.

COPENHAGEN

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Since signing the C40 Clean Air Cities Declaration in 2019, Copenhagen has established baseline levels in order to measure progress in achieving World Health Organisation (WHO) guidelines.

In its Municipal Plan 2019, the city of Copenhagen has adopted WHO guidelines as a goal. A new appendix to the CPH2025 Copenhagen Climate Plan's Roadmap 2021–2025 was adopted in August 2021.

By reducing the use of fossil fuels, Copenhagen has undertaken an important step towards achieving WHO guidelines and becoming a city with cleaner air, less noise, energy-friendly housing and greener mobility by 2025.

Key successes include the new city metroline opened in 2019 and a line to Nordhavn in 2020. Currently, 92% of city-owned passenger cars are electric or hydrogen vehicles, and 23% of city buses will be zero emission by the end of 2021.

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DELHI NCT

Since signing the C40 Clean Air Cities Declaration in 2019, the Government of the National Capital Territory of Delhi (GNCTD) has declared its intention in lowering ambient air pollution by a third of 2020 levels. Between 2017 and 2020, the average annual PM_{10} and $PM_{2.5}$ levels reduced by approximately 25% across Delhi. The commitment to implement substantive policies and programmes that address the top causes of air pollution is on track with multiple key successes already.

Multiple real-time air quality monitoring stations and other monitoring networks have been deployed across Delhi to enable prompt action towards achieving the city's ambitious targets. GNCTD and Delhi Pollution Control Committee (DPCC) have expanded the network of air quality monitors in Delhi from 4 to 24 monitoring stations, resulting in a total of 40 continuous reference grade air quality monitors (including those by the Government of India).

In 2020, GNCTD released its Electric Vehicle Policy to provide incentives and subsidies to citizens purchasing electric vehicles. The policy's goal is to move 50% of Delhi's vehicle fleet to EVs by 2025. Within a year of the launch of the policy, 20,000+ electric vehicles have been purchased and registered in Delhi, and 6% of the total vehicles registered are EVs.

In the winter of 2019, the GNCTD implemented the odd-even scheme for pollution control that resulted in an approximately 14–15% reduction in PM levels during the winter months. Delhi became the first state in India to pilot and implement such a stringent anti-pollution emergency measure.

Through a combination of policy measures and strict enforcement, GNCTD has moved all industries within Delhi to operate on Piped Natural Gas (PNG), thus removing all sources of unclean fuel used in industries in the city. GNCTD has also provided around the clock electricity to 100% households and businesses within Delhi, removing the need for any diesel generator usage.

In October 2020, GNCTD launched a public grievance redressal system for pollution, "Green Delhi App," to enable citizens to report environmental violations. More than 32,000 complaints have been lodged by citizens on the app since with 90%+ having been resolved by coordinated actions by 27 different civic agencies in Delhi.

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DUBAI

Dubai is working to implement the Dubai Air Quality Strategy 2017–2021, which aims to ensure that the city's 3.3 million residents have clean air to breathe. This strategy has set ambitious reduction targets towards achieving the overall objective of 90% clean air days (compared against UAE air quality standards) by 2021. Dubai has been successful with its goals, as 99.1% clean air days were reported in 2020.

To protect the health of its residents, Dubai has introduced an Air Quality Monitoring Network, which provides robust, accurate and reliable datasets. Dubai recently expanded the network with the addition of three monitoring stations that measure NO_2, SO_2, CO, O_3, PM_{10} and $PM_{2.5}$ – particles that are all toxic for human health – across the city, making a total of 15 monitors that measure criteria pollutants.

The city has also embraced technology to better monitor its air quality, as in March 2021 Dubai successfully launched the DMSAT-1 (Dubai Municipality Satellite-1), an environmental microsatellite. The satellite measures atmospheric aerosols/particulate matter and greenhouse gases. The data provided by the satellite will be used to find solutions and develop long-term plans to confront the challenges of urban pollution and climate change and explore future environmental realities in Dubai and elsewhere in the United Arab Emirates.

As a further branch of the city's goal to keep air pollution as low as possible, Dubai has been implementing substantive policies and programmes to address the top causes of air pollution emissions under the Air Quality Strategy 2017–2020. This strategy resulted in substantially reduced emissions of 28% and 45% (from business as usual) in 2019 and 2020, respectively. Building on this legacy, Dubai has formed a committee to coordinate across departments to set air quality targets as part of the Dubai Plan 2030 – Dubai's plan for a sustainable and innovative future. This will also build on both local and C40 commitments to ensure that air quality remains at a healthy level for all of the city's residents.

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DURBAN (ETHEKWINI)

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Durban has procured new reference monitors for the monitoring of sulphur dioxide, particulate matter and benzene. The data acquisition system was also updated along with the server. Quality control has been carried out on all historic datasets to date and uploaded to the South African Air Quality Information System.

Sulphur dioxide levels have been established for the city and are in compliance with country standards. PM_{10} and $PM_{2.5}$ levels have also been established, alongside NOX levels in congested areas and city hotspots. The city has procured a total of 26 reference method instruments.

The city has reviewed and aligned its air quality by-laws. These by-laws will assist in updating the city's air pollutant emission inventory, especially from small industrial and commercial activities, as well as helping to regulate emissions from local sources. The by-laws also enable the city to establish its own ambient standards and emission limits, which have to be developed in policy.

A bottom-up, city-wide emission inventory of air pollutants is being carried out and aligned to the greenhouse gas emission inventory. The city has modelled emissions inventories of industries and identified the top contributors as industrial sources using solid fuels.

Over the coming year, Durban plans to develop the concept of low emission zones through C40 funding; evaluate compliance with emission standards of key major emitters of PM, SOX, NOX and Benzene and how compliance with National Ambient Air Quality Standards can be achieved; incorporate requirements into atmospheric emission licence and postponement applications; update emission inventory of vehicles; and conduct benefits analyses of certain air quality actions such as doing away with dirty fuels, and compliance with stricter emission limits.

Durban is delivering on the C40 Equity Pledge commitment by reporting equity and inclusion considerations in its climate actions

Durban carried out an equity assessment to inform the design of their low emission zone. A key finding from the assessment of their low emission zone was that this action can significantly decrease exposure of street vendors to poor air quality. A large portion of these street vendors tend to be elderly women who could otherwise be disproportionately affected by emissions coming from vehicle traffic. From this assessment, the city of Durban also found that low-income communities living in and around these low emission zones have a high dependence on taxis, so extra effort will be needed to ensure residents still have access. The city proposes subsidising low- or zero- emission transport to ensure these low-income communities continue to have access to affordable mobility solutions and are not disproportionately affected by this climate action.

GUADALAJARA

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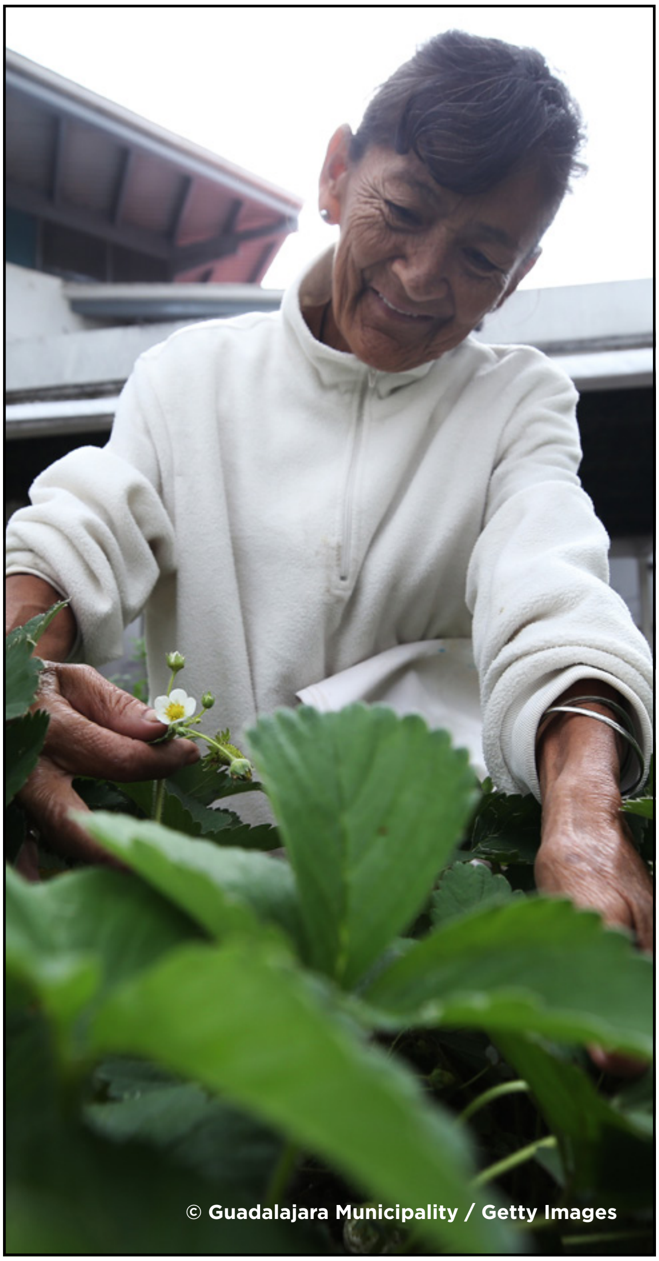
The issue of air quality in the city of Guadalajara is seen from two different perspectives: municipal and metropolitan (through the state government). To improve air quality, the municipality is focused on the management of green areas and trees, as well as the installation of the best quality cycling and pedestrian infrastructure. At the metropolitan level, the city works hand in hand with the Jalisco Secretariat of the Environment and the Metropolitan Planning Institute for the implementation of mobility programmes, and for air quality monitoring.

As of August 2021, all private vehicles are being verified thanks to the new 'Responsible Verification' programme. The verification programme ensures that any automobile that circulates in the Guadalajara Metropolitan Area complies with the official Mexican standards and thus reduces the emission of pollutants into the atmosphere.

Guadalajara has been working to expand cycling in the city, and has delivered more than 100 km of cycle lanes. In addition, following a technical assistance provided by the C40 Cities Finance Facility to public authorities in the city of Guadalajara and the state of Jalisco, the state received a fleet of 38 new Sunwin electric buses, which will be operated mostly by women drivers. The buses will operate in the country's first fully electric corridor, as part of the state's Bus Rapid Transit system.



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HEIDELBERG

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As part of the actions to achieve the goals of the C40 Clean Air Cities Declaration and in order to further reduce traffic emissions, the city has initiated various measures.

The electrification of the municipal vehicle fleet is on track with a share of 11% battery electric vehicles and fuel cell electric vehicles. The electrification of the bus fleet is to be implemented as part of a hydrogen model project. A depot is currently being set up for buses to be procured from 2022 onwards.

The Heidelberg ‘Environmentally Friendly Mobile’ funding programme has been very successful: in 2020, the city funded 81 annual passes for people who gave up their car. In addition, the city delivered 89 e-cargo bikes, 44 company pedelecs, 63 e-cars and 62 private charging stations.

As part of the new ‘Heidelberg Transport Development Plan 2035’, which is currently being drawn up, the proposals of the Green City Plan are being further developed and concretised.

In addition, as part of the ‘MeteoHD’ project, a data platform with real-time air quality and meteorology data was made available online: https://klimakompass.heidelberg.de/. The aim of the project is to provide environmental information on air quality and the urban climate and to raise awareness of the use of environmentally friendly means of transport.

HOUSTON

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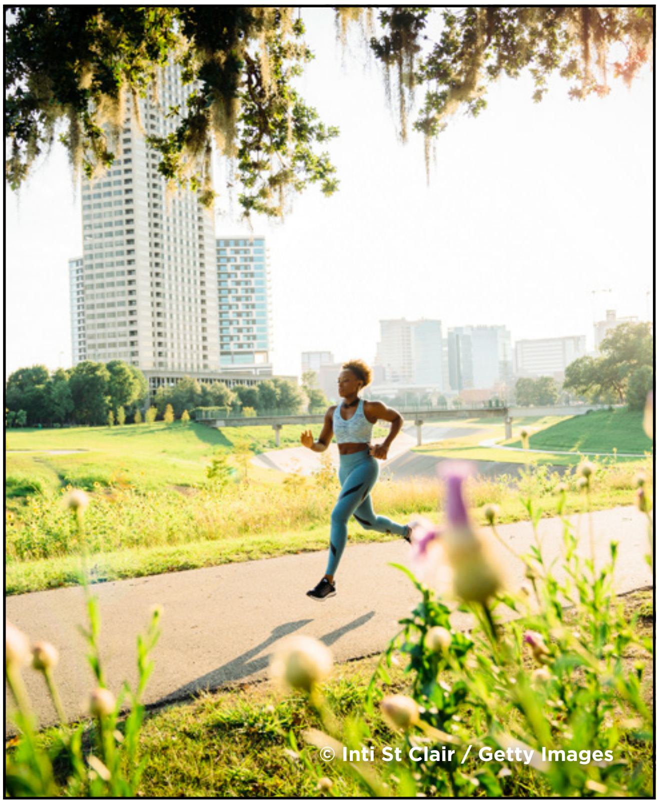
As part of the actions to achieve the goals of the C40 Clean Air Cities Declaration, Houston is improving on ambient formaldehyde and benzene monitoring. The city focused on conducting monitoring in communities that have some of the highest air pollution in the city to provide data to inform better regulation.

In addition to the fixed monitors, key successes include a mobile monitoring method used by a group of experts in some of the areas of concern. This led to the additional identification of point source emissions. In 2022, Houston plans to increase mobile monitoring surveillance to identify further point source emissions. The city also continues to work with and advocate for the national government to take action on sources outside its boundaries or its control.

The city is also working to promote cycling in the city. Currently, there are some 345 miles of high-comfort bike lanes in Houston, and the city aims to have 1,800 miles by 2027. The Houston BCycle Sharing Bikes services also continues to expand and promote sustainable living. Currently there are 129 stations and 1100 bikes available throughout Houston, making bike transportation easy and affordable.

Finally, the Metro Transit Authority of Harris County (Houston METRO) will be adding battery electric buses to its fleet and is working to purchase 20 full-size electric buses and 10 paratransit vans.



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JAKARTA

Since signing the C40 Clean Air Cities Declaration in 2019, the Provincial Government of DKI Jakarta has compiled a Roadmap for Air Quality Improvement, which in its preparation involved all stakeholders, central government, related institutions and agencies, environmental groups, NGOs, universities and city governments around Jakarta.

Jakarta has worked to expand its monitoring network and now has five fixed air quality monitoring stations spread over five city areas and three mobile stations. The monitoring stations are being used to set air quality baselines and targets for pollutants reduction in alignment with the World Health Organisation guidelines and existing regulations in Indonesia. The targets will be set out in the Air Pollution Control Grand Design Document will be completed by the end of 2021.

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Since February 2021, a low emission zone has been in place in the Kota Tua (Old City) area. Meanwhile, the DKI Jakarta Provincial Governor Instruction concerning air quality has set out seven actions:

- Public vehicle rejuvenation and emission tests
- Odd even, parking rates and congestion prices
- Vehicle age restriction and private vehicle emission tests
- Mode switching, improved comfort and pedestrian facilities
- Industrial sector control
- Greening of public facilities and infrastructure
- Renewable energy

The provincial government also passed a Governor's Regulation (66/2020) on Motor Vehicle Exhaust Emission Tests. Based on that regulation motor vehicles operating in the city of Jakarta should pass the exhaust emission test. The data of the exhaust emission test works in conjunction with the parking system to disincentivize motor vehicles that didn't pass the test.

Data on vehicles tested for emissions have been integrated with the parking system so that the government can apply disincentives to vehicles that have not been tested for emissions and park in specific locations.

Finally, an important activity planned for the coming year is the process of establishing regional regulations on electronic road pricing.

LIMA

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Since signing the C40 Clean Air Cities Declaration, the Metropolitan Municipality of Lima has taken actions to improve the city's air quality in order to fulfil World Health Organisation guidelines. In addition, the city has implemented new public policies and programmes to monitor and then reduce air pollution levels.

Lima's mayor institutionalised the monitoring network through mayoral decree in March 2021. The city's monitoring capacity has been increased by 176%, with 35 air quality modules with low-cost sensors deployed at strategic points in the city. Five of these monitors focus on children (0–6 years), working with Horizonte Ciudadano Foundation through the 'Aires Nuevos para la Infancia' project. Likewise, with a mobile monitor air quality has been measured in real time in the area of Damero de Pizarro, in the historic centre of Lima.

The city is acquiring fuel catalysts to reduce emissions from vehicles. Meanwhile, under the Sustainable Mobilisation Plan the city has built 97.35 km of bicycle lanes in the province of Lima. A pedestrianisation plan is in place for the historic centre of Lima, and by the end of 2021 at least 30 blocks will be pedestrianised, with eight already implemented.

In February 2021, the city approved the exemption of electric and hybrid vehicles from the Pico y Placa Plan (driving restrictions based on alternate-day travel implemented in July 2019). Furthermore, since December 2020, the city has prohibited the use of pyrotechnic products in all municipal organised activities.

Next year the city will establish the technical criteria for the implementation of a low emission zone within the district of Cercado de Lima (central Lima). Subsequently, in the Historic Centre of Lima, the city is working on implementing the first low emission zone in the city and in Latin America. Finally, the city will implement quality public policies focused on early childhood and youth, through the draft ordinance 'Clean Air for Childhood Development'.

Lima's interactive air quality map

Lima has worked to put its residents in the centre of its air quality work. Lima is building an ambitious air quality monitoring system, which is empowering citizens and civil society through accurate and visible information on air quality. An interactive map allows city residents to check in real time air quality levels in different areas of the city, therefore raising awareness of the issue and giving city residents and civil society the information they need to encourage informed and active public participation in elaborating solutions for the city. Find out more here.

LISBON

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Based on the World Health Oganisation reference values for air pollution in 2030 and the city's Air Quality Improvement Plan (February 2019), Lisbon is committed to reducing air pollution, using 2011–2014 as a baseline. By 2023 the city aims to achieve:

- 14% of the concentration of PM_{10} (annual limit value: 40 µg/m^3 and daily limit value: 50 µg/m^3, not to be exceeded more than 35 times per calendar year);
- 21% of the concentration of NO_2 (annual limit value: 40 µg/m^3); and
- 16% of concentration of NO_2 (hourly limit value: 200 µg/m^3 not to be exceeded more than 18 times per calendar year).

In 2021, Lisbon strengthened its air quality monitoring capacity by installing more than 600 sensors in various locations around the city, which will help the city track improvements in air quality.

Road traffic continues to be the main source of air pollution in the city of Lisbon. Over the last decade, Lisbon has recorded a significant decrease in pollutant emissions, achieved through the implementation of measures focussed on sustainable mobility. In addition, the city's Mobility 2030 Strategy, published in October 2020, will help the city to continue reducing emissions and achieve the targets for urban mobility and accessibility.

Several measures have been implemented through the Air Quality Plan Execution Program, which is nearing completion. These include enhancement of low emissions zones; regulation of the transit, stopping and parking of vehicles involved in the tourism industry; review of the framework for loading and unloading operations; promotion of electric mobility; introduction of mobility plans, and in particular in the low emissions zone on Avenida-Baixa–Chiado, which will reduce the number of cars in this area by around 40% (40,000 cars) a day; and emergency measures planned for days with air pollution episodes.

Lisbon's Climate Action Plan also lays out the strategy to reduce greenhouse gas emissions by 70% by 2030 and 100% by 2050 compared to 2002. In addition to the decarbonisation goal, the city has also made a commitment to eradicate energy poverty by 2050.

Giving the streets back to citizens with the 'This Street is yours!' programme

The programme 'The street is yours!' began in 2019, between May and December, on the last Sunday of each month. On Avenida da Liberdade, the street closed to car traffic and gave way to leisure and sports activities, street food, an organic market, handicrafts and the possibility of using active modes of transport, such as bicycles, scooters and electric vehicles. There are now initiatives planned for around 100 streets. During the COVID-19 pandemic, a number of changes were made to the programme to give more space to people on the streets, ensuring physical distancing, promoting active mobility, improving access to local commerce, increasing areas for terraces and creating new leisure spaces.

LONDON

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The city has embraced science and data to better tackle the problem of pollution, with London's air quality being constantly monitored at over 200 different locations to help identify problematic air pollution hotspots.

In February 2020, the Mayor of London decided to fund a four-year continuation of the pilot phase of the 'Breathe London' network that covers the roll-out of 100+ new sensors. The network uses cutting-edge, lower-cost air quality monitoring sensors that analyse harmful pollution in hundreds of toxic hotspots across the city including near schools, hospitals, construction sites and busy roads. Building on the success of Breathe London, the Mayor in his capacity as Chair of C40 wants to replicate its success with Breathe Global. This will provide an opportunity to develop an integrated, comparable monitoring network across the world providing real time information to citizens enabling them to demand further action while also supporting policy innovation, monitoring and evaluation.

London has also been implementing new substantive policies and programmes to address the top causes of air pollution emissions. In April 2019 the Mayor of London launched the world's first Ultra Low Emission Zone (ULEZ), which contributed to a reduction of 44% in roadside NO_2 in central London. In October 2021, the Mayor expanded the ULEZ to an area 18 times the size of the original central London zone. In its first month of operation, 92% of vehicles operating in the new zone met the standards, up from 39% in February 2017 when changes associated with the ULEZ began. On an average weekday there were around 47,000 fewer older, more polluting, non-compliant vehicles seen in the zone compared to two weeks before the scheme was introduced (a 37% reduction). Overall, there were 11,000 fewer vehicles driving in the zone each weekday (a 1% reduction).

Together, the expanded ULEZ and tougher standards for the London-wide Low Emission Zone for heavy vehicles will reduce NOx emissions from vehicles by nearly 30% across the city. It will also help tackle the climate emergency, reducing carbon emissions from cars and vans by 100,000 tonnes which is equivalent to taking 60,000 cars off the road.

By 2025, London expects the whole of the city to meet legal limits. An independent study estimated that, had the Mayor not taken this action, it would have taken 193 years to reach legal compliance.

To ensure London's streets are safer, greener and more suited for pedestrians and cyclists, the city leadership has introduced a raft of measures. Since May 2020, London has trialled 89 trial Low Traffic Neighbourhoods, areas that minimise vehicle access and maximise people's ability to walk and cycle with an absence of traffic. These schemes are currently being reviewed to determine which will be made permanent. Since April 2020, almost 350 School Streets (where roads near schools are closed to traffic during drop-off and pick-up times) have been delivered across London to tackle children's exposure to air pollution and improve their health.

The Mayor of London is proud to have increased the number of protected bike lanes (cycle lanes that are separated from motor traffic) three-fold during his first term (2016-2020), with more than an additional 100 km of new or upgraded bike lanes since May 2020. Research by Transport for London found that protected cycle routes on busy streets would address safety barriers to cycling faced by people from diverse backgrounds and women, and boost cycling levels overall by more than 40%. Participation from ethnic minority communities has grown since 2020 and is now comparable to cycling levels of white Londoners.

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LONDON

To continue reducing London's overall emissions from cars, the city now has over 7,500 electric vehicle charge points, a third of the UK total, and over 4,400 zero-emission capable taxis. Thanks to the £61 million scrappage fund provided by the Mayor to help small businesses and low-income or disabled Londoners to scrap older, more polluting vehicles, over 13,300 vehicles have been removed from London's roads.

The Mayor has made huge strides in increasing and protecting the capital's green spaces, securing London's status as the world's first National Park City. Over £20 million has been invested to help make London greener, including creating and improving over 400 hectares of green space and the planting of over 340,000 trees.

However, London has not stopped taking innovative and bold climate action as the city has committed to a multi-million pound Green New Deal package up to 2023. The objective of the Green New Deal Mission is to tackle the climate and ecological emergencies and improve air quality by doubling the size of London's green economy by 2030 and accelerating job creation for all. The funding is supporting the development of two Future Neighbourhoods to exemplify what London could look like in meeting its 2030 net zero carbon targets as well as projects on renewable energy and support to circular economy entrepreneurs.

London's Schools Programme

Schools programme - through the Mayor's school and nursery air quality audit programmes, 50 primary schools and 20 nurseries located in the most polluted areas of London have received audits, advice and funding to reduce air pollution in and around their school premises. Some examples of mitigating measures implemented by schools include School Streets, green screens, air filtration systems and the promotion of active travel through the installation of cycle/scooter storage. In addition, since April 2020, almost 350 School Streets have been delivered across London with funding from Transport for London (TfL) and the boroughs to tackle children's exposure to air pollution and improve their health. Air quality policies have reduced the number of state primary and secondary schools in areas exceeding legal limits for NO_2 from 455 in 2016 to 14 in 2019, a reduction of 97 per cent.

TfL has published survey results which suggest that interventions outside schools to make walking and cycling safer are popular with parents and carers and have contributed to a drop in car use. Studies have shown School Streets have improved air quality, with reductions in NO_2 of up to 23% during morning drop off.

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LONDON

London is delivering on the C40 Equity Pledge commitment by reporting equity and inclusion considerations in its climate actions

London carried out an equity assessment on its Ultra Low Emission Zone as well as the impact of the city's environmental strategy on air pollution exposure. A key finding from the assessment of the ULEZ is that it will result in increased personal health and well-being as a result of improvements in air quality as people switch to less polluting vehicles and other modes of transport. Potential negative impacts could be felt by low-income workers who work more unsocial hours and travel to work in central London by car with the inability to afford a ULEZ-compliant vehicle or pay the associated charge, as well as disabled residents who may find it harder to find alternative modes of accessible transport to central London. In order to address this, the Mayor has delivered a £61 million scrappage scheme for low-income and disabled Londoners. London has also introduced policies to improve nighttime services for London's public transport system, as well as undertaking research and working to improve accessibility for all to London's transport.

Recent policies to improve air pollution have also reduced the inequality in exposure between different socioeconomic groups. This reduction is the greatest for NO_2, the pollutant which is most dominated by local sources. The difference between the most and least deprived was reduced from 7.6 $\mu g/m^3$ in 2013 to 3.8 $\mu g/m^3$ in 2019, a reduction of 50 per cent.

LOS ANGELES

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Since signing the C40 Clean Air Cities Declaration in 2019, Los Angeles (LA) has been making sustained progress at implementing programmes through LA's Green New Deal (GND). These are helping meet air quality goals including attaining federal ozone pollution standards by 2025, by reducing air pollution through two critical branches of work:

- Improvements in tracking both city-wide and neighbourhood-level air quality:

The C40 Air Quality Network helped identify the need for the city to improve tracking of hyperlocal air emissions and informed the development of various community monitoring programmes in LA's most burdened communities, including the Watts community where over 30 low-cost sensors have been installed.

Additionally, the city is in the process of finalising its first ever city-wide air pollution inventory, which will be announced and shared publicly.

- Actions that tackle the city's largest source of air pollution – the transportation sector:

LA's GND lays out a strategy to reduce emissions from the transportation sector by electrifying all on- road vehicles by 2050, including electrifying city bus fleets by 2028, as well as reducing vehicle miles travelled by building out the city's public transit infrastructure and encouraging mode shift.

Los Angeles has made tremendous progress in these areas. In 2019, LA's Department of Transportation placed the nation's single-largest purchase order for 155 electric buses, of which 27 are in daily operations and have logged over 50,000 e-miles since 2021.

The city is also planning the implementation of a zero emissions area (ZEA).Baseline air pollution levels will be measured.

LA City Council recently passed a municipal code allowing the city to designate zero-emission freight/delivery curb designations ('zones') and will pilot 5 curbs in the city.

The expansion of electric vehicle charging stations continues with over 14,000 commercial fast (level 2) charging stations installed.

The Port of LA continues making steady progress in achieving the Clean Air Action Plan goals including ensuring all trucks are zero emission by 2035 and introducing zero-emission cargo-handling equipment by 2030.

LOS ANGELES

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People for Mobility Justice and Cleantech Incubator

Despite the challenges of COVID-19, People for Mobility Justice (PMJ) delivered over 30 virtual bicycle safety education classes to the most vulnerable communities in Los Angeles County as well as residents nationwide. In August 2020, PMJ also hosted a symposium led and designed by Leimert Park residents and organisers who participated in the 'Hood Planners Certification' pilot programme. The day was filled with grounding attendees in conversations about radically imagining community safety alternatives through arts, culture and creative place-keeping for better mobility justice.

The Los Angeles Cleantech Incubator launched three zero-emissions mobility and community pilots with community partners in Pacoima, San Pedro and Leimert Park. These pilots are bringing the benefits of the green economy to neighbourhoods that often lack access to zero-emission mobility solutions, yet are burdened with poor air quality. Lessons from these projects will be shared and used to inform new projects and policy recommendations.

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MADRID

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Since signing the C40 Clean Air Cities Declaration in 2019, the Madrid City Council has presented the Madrid 360 Environmental Sustainability Strategy in September 2019. Made up of 200 measures, it is a comprehensive initiative that covers 21 districts and all sources of emissions.

It includes the lines of action of the previous plan (Plan A for Air Quality and Climate Change) and reinforces the air quality objectives to comply with European and national legislation on air quality and limits set by the World Health Organisation (WHO), and to achieve quality levels for PM_{10} and $PM_{2.5}$ particles in accordance with the WHO guideline value.

The Madrid 360 Strategy is structured around six main pillars, of which four are directly related to the reduction of pollution and improvement of air quality.

During the last two years, and despite the COVID-19 pandemic, the city has implemented several actions of the Madrid 360 Strategy including aid for the renewal of taxi fleets; replacement of diesel buses in the city's EMT fleet with CNG and electric vehicles, and the creation of free zero-emission bus lines; subsidies for the replacement of coal and diesel boilers; expansion of the electric recharging infrastructure; and the promotion of cycling and pedestrian mobility.

The Madrid City Council has also met a number of milestones related to the objectives of the declaration. It has approved a new Air Quality and Sustainability Ordinance that aims to improve air quality in the city, protect the health of residents and the environment, and promote energy efficiency and the use of renewable energies to ensure environmental sustainability. Meanwhile, the Madrid City Council's Roadmap Towards Climate Neutrality sets the goal for 2030 to reduce greenhouse gases by up to 65% compared to 1990 and combines climate and air quality actions. Finally, the city has modified the Taxi Regulatory Ordinance, which among other actions will require all taxis to be zero emission or ECO label.

The main recent activity is the approval of the modification of the Sustainable Mobility Ordinance, that regulates the Madrid Central Low Emission Zone and Plaza Elíptica, and restricts the circulation of more polluting vehicles (without environmental distinction) within the entire interior of the M30 ring road. The city has also put out a call for grants for less polluting electrical infrastructure and vehicles.

MEDELLÍN

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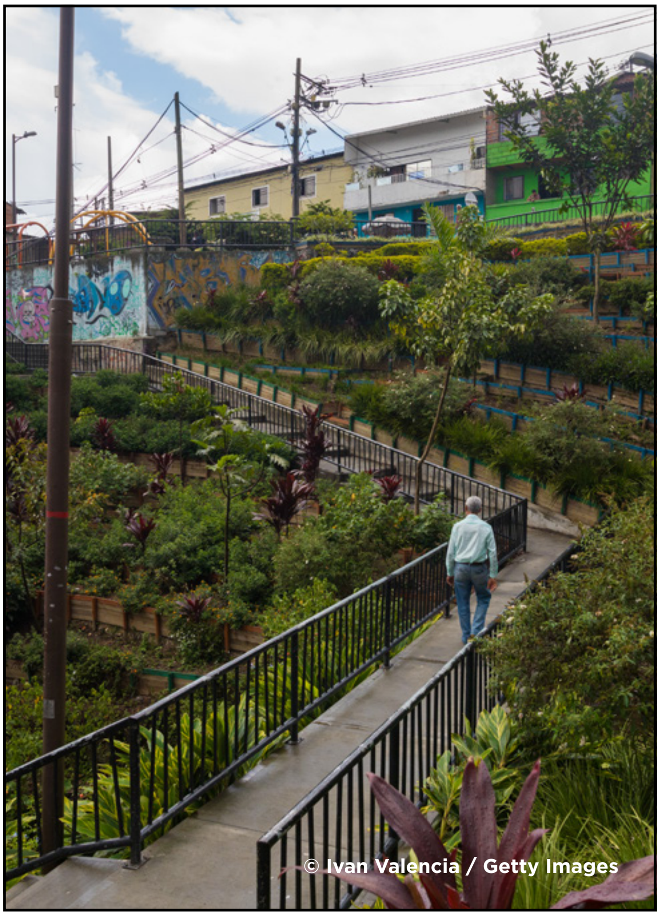
Medellin's municipal government is working to meet the goals of the Integrated Air Quality Plan ("PIGECA"), and the Municipal Development Plan ("PDM") 2020–2023. In addition, all efforts are focused on complying with current national air quality regulations, taking into account the values recommended by the World Health Organisation.

Goals and indicators were included in the Municipal Development Plan aimed at building sustainable mobility within the territory, strengthening public transportation, and avoiding emissions from mobile sources.

The city has also developed initiatives such as the 'Pacto por la Calidad del Aire' (Air Quality Pact), which aims to improve air quality in the city and the region through voluntary commitments of different entities. In addition, the city has incorporated strategies aimed at the development of increasingly sustainable institutional activities, such as the 'eco-driving and good environmental practices' training programme.

Medellin carries out air quality management with a coordinated approach between municipal government departments, especially during critical air pollution episodes. Key success in this area include the update of vehicle acquisition policies so that vehicles operate with cleaner technologies; work to increase charging infrastructure for electric vehicles and replacement of public transportation vehicles; deployment of 69 electric buses; and negotiations with the national government to improve the energy efficiency of buildings.

Other activities carried out successfully include the structuring and implementation of urban protected air zones, together with processes of awareness-raising, ownership, and dialogue with citizens; promotion and incentives for low- and zero-emission mobility systems; formulation of a public policy to promote the renewal of vehicle fleets; and the planning and execution of mobility projects that consider gender and universal accessibility, promoting walking and cycling, and integration with the Aburrá Valley Integrated Transportation System ("SITVA").



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MILAN

As a signatory of the C40 Clean Air Cities Declaration in 2019, Milan drafted its first Air Quality and Climate Plan (AQCP), engaging citizens in the approval process by means of several participation initiatives. Currently the AQCP, setting the strategy to improve air quality and decarbonise the city, is at the final approval stage by the City Council.

Milan's main goal in terms of air quality is to comply with the threshold values set by the World Health Organisation Guidelines for Air Quality by 2050, and EU air quality concentration limits by 2025. The aim is to protect health and increase the quality of life of residents exposed to air pollutants concentrations not in compliance with EU legislation.

This can be achieved through continuous improvement by strengthening emission sources regulations. Accordingly, the AQCP includes several related measures such as discouraging private road traffic and traffic limitations (low emission zone, zero emission zone), pedestrian/cycle ways development and active mobility promotion.

To support air quality improvement actions, in Q4 2020 the 'Air Quality Regulation' (AQR) was issued, tackling construction sites sources, non-road mobile machinery and fixed sources, such as buildings. Air pollutants from buildings will be reduced by means of heating systems control campaigns, energy efficiency promotion and wood combustion regulations. Furthermore, the AQR also introduces a smoking ban in open spaces.

One of the actions in the AQCP is the strengthening of air quality monitoring at the local level with 'near reference' sensors located in compact and relocatable stations. These measurements allow the city to assess the impact of local measures taken to curb emissions and address local/microscale urban planning. A digital platform will be deployed to collect and make a comparative assessment of available air quality measurements in Milan, including validation of Citizens Science data thanks to air quality modelling tools, also in collaboration with the Regional Environmental Agency. To raise awareness among citizens, events and engaging initiatives will be organised.

Mayor of Milan and C40 Vice Chair, Giuseppe Sala

> *"In Milan, we have always been very clear about the fact that air pollution and the climate crisis go hand-in-hand. Becoming a signatory of the "C40 Clean Air Cities Declaration" has further pushed us to tackle both problems at the same time through joint policies addressing the sources of pollutants and GHG emissions. For this reason, we have drafted an "Air Quality and Climate Plan", bringing together within the same strategic document the vision, objectives and actions necessary to improve Milan's air quality and decarbonize the city. Certainly, the Plan has greatly benefitted from the synergies between the "C40 Clean Air Cities" and the "C40 Green and Healthy Streets" Declarations, both endorsed by Milan, as together they have provided great stimulus and innovative tools to address one of the main threats to citizens' health and environmental wellbeing, that is traffic."*

OSLO

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In terms of ambitions to better air quality, Oslo aims to reach health authorities standards for air quality in line with the World Health Organisation (WHO) guidelines and work for stricter limit values also at the national level. In addition, the city is working on establishing more monitoring stations and air quality sensors, and reducing exposure through city planning.

The air quality in Oslo has improved clearly in the last years for the NO_2-component, thanks to effective abatement measures for reducing exhaust from road transport. This has led to compliance with the WHO air quality standards for NO_2 in Oslo for the last three years.

The city has adopted a new air quality action plan, which also addresses measures for reducing PM levels towards levels aligned with the WHO air quality standards. The plan includes measures to better air quality by 2025. Oslo has established new monitoring sites within the last two years, which are placed in central parts of the city. In addition, Oslo is working on establishing a network with microsensors to supplement traditional monitoring sites.

Finally, the city is currently working on a new urban development plan that will also address air pollution and exposure. As part of the city's climate mitigation efforts, Oslo is planning to introduce a Zero Emission Zone (ZEZ). Restrictions will, according to plan, apply to light vehicles in a central zone in 2022. The city is investigating how the zone can be expanded to all types of vehicles in a larger area of the city by. The ZEZ will contribute to further reductions in air pollution.

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PARIS

In January 2015, Paris created the first low emission Zone in France, to limit access to the centre of Paris for high-polluting vehicles. The gradual implementation of the system will reach a zero diesel objective in Paris in 2024 and will ban gasoline-powered vehicles by 2030.

The Greater Paris area also implemented a low emission zone on 1 July, 2019, with the same level of restrictions as the Paris zone since 2021.

In addition, the city is working on the implementation of a 'Restricted Traffic Zone' in the centre of Paris. Transit traffic will be prohibited, except for residents, professionals, taxicabs and public transport. Currently, 350,000 to 500,000 cars per day travel through this area.

Paris' public transport operator (RAPT) aims to order 800 electric buses by 2024 to replace the existing diesel buses. All RATP buses will be powered by electricity or bio-gas by 2025. Meanwhile, a new logistics strategy is being defined for cleaner logistics transportation within the city.

The Express Bike Network has been developed and new bike lanes were put in place during the COVID-19 crisis. Paris now has a network of more than 1,000 km of bicycle lanes.

More than 100 'Rues aux écoles' (School Streets) have been launched since September 2020, and more are planned. These aim to pedestrianise the streets around Parisian schools. They are intended to reduce noise and air pollution (dans une moindre mesure) and improve road safety.

A total of 27 'Paris Respire' (Paris Breathes) zones are in place. These zones are pedestrianised every Sunday. In addition, the city has implemented a speed limit of 30 km/h in almost all the streets of Paris.

The city of Paris and the Greater Paris Metropolis have together launched studies to 1) better understand river traffic emissions and establish a joint action plan to address these. Eight boats will be equipped with sensors to measure tailpipe pollutants, and measurements will also be taken on the banks of the Seine river. The results of the study are expected in late 2022. 2) Identify emissions from wood fires and establish an action plan. The results of this study are expected by the end of 2023.

A new study has been launched in 2021 with Airparif and Bloomberg Philanthropies: Measurement of ultrafine particles in Paris in 2022 to characterise spatial and temporal emission factors

Finally, the City of Paris is in the process of updating the 'Air' component of its Climate Air Energy Plan in order to assess the effectiveness in terms of emission gains of actions already implemented and those yet to be implemented in order to comply with European regulations by 2025, and World Health Organisation recommendations by 2030. A biennial review of the actions is planned. Citizens can expect the update of this 'Air Action Plan' in 2022.

PARIS

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Protecting children from air pollution

Paris is working to improve air quality and bring health benefits to its residents.

At the beginning of the 2021 school year, traffic will be banned in the vicinity of 185 Parisian schools. While the children were on summer vacation, the city continued its work to pedestrianise and create greenery around the schools. Sixty new streets were under construction last summer. The CAUE (Conseil d'Architecture, d'Urbanisme et de l'Environnement) of Paris will support the implementation of 17 School Streets in different districts, with participatory workshops in schools or nearby recreational centres.

To increase awareness, the city measured air quality in the surroundings of 44 nurseries, schools and colleges. At a public meeting for the educational community, representatives, parents of students and associations, the city presented the results of research conducted with Bloomberg Philanthropies to improve air quality. A new partnership with Bloomberg Philanthropies is launched to improve Parisien citizens' awareness of air quality and to support them with participative citizen measurements with microsensors, accompanied by Airparif and city's experts.

Finally, by the beginning of the school year, almost all of Paris had a maximum speed of 30 km/h except for a few roads.

Paris is delivering on the C40 Equity Pledge commitment by reporting equity and inclusion considerations in its climate actions

Key findings from impact assessments show the low emission zone is positively impacting the most disadvantaged populations living along major traffic routes, such as children, the elderly and low-income groups. However, there are financial burdens on low-income populations who may be required to change vehicles and, in order to address this, financial assistance is provided to these groups by local authorities throughout the city. The city has also carried out citizen engagement processes such as educational workshops that target young people or residents of the most disadvantaged neighbourhoods in order to raise awareness of actions taken by the city to reduce air pollution.

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PORTLAND

Since signing the C40 Clean Air Cities Declaration in 2019, the COVID-19 pandemic, climate emergencies and social justice transformations have shifted city of Portland work plans. How to meet the immediate and long-term health needs of Portlanders are priorities. Health interconnects to many priorities from communities.

In 2020, the city of Portland adopted a Climate Emergency Declaration. The city commits to using a new climate-justice and equity-focused approach that centres Black, Indigenous, other communities of colour, and youth from those communities in the next chapter of climate action planning and implementation. This work has highlighted the need for sustained funding for both climate and air quality actions.

Local and state reports document the unique air pollution mitigation needs for Portland compared to the rest of Oregon. In response, Portland is developing a policy proposal for a clean air fee to establish a Clean Air Program. This programme would work in partnership and collaboration with state agencies and other local jurisdictions to improve air quality and the health of the local community. The fee and resulting programme would help further support progress on clean air actions. If adopted, outcomes include communities and businesses having better access to resources to reduce air pollution sources and exposure. Improving access to data and information for communities, regional partners, and city staff are also proposed outcomes.

In the meantime, progress has continued on several actions: implementation of a clean air construction contracting programme, coordination to provide assistance to diesel equipment owners to replace or retrofit engines, and investment in the decarbonisation of the city’s fleet.

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QUEZON CITY

Quezon City proved its dedication to ensure its residents were breathing clean and healthy air by becoming a signatory of C40's Clean Air Cities Declaration in 2019. To comply with the commitments of the declaration, Quezon City applied for and was chosen as a beneficiary of the C40 Air Quality Technical Assistance Programme, which focuses on capacity building and creating new tools and resources for cities to improve air quality. Under the programme, the city is working to create an estimate of current baseline air pollution characteristics in the city and has already developed an Air Quality Management Plan Roadmap, which provides strategic and long-term strategies that will guide Quezon City in the attainment of its clean air objectives.

Together with C40 Cities and Clean Air Asia, Quezon City has installed the following in strategic parts of the city: eight low-cost air quality monitoring sensors and one reference-grade ozone monitor, and a weather station to carry out a baseline air quality study. The study's findings will be used as the basis for setting interim targets for 2021 to 2029 to meet both national standards and World Health Oganisation guidelines regarding air quality. To increase knowledge and share peer-to-peer learning, a series of technical training sessions were also conducted with selected city officials to strengthen the capacity of city stakeholders in the operation and management of the air quality monitoring network. In addition, the city has started the procurement process for an additional 12 low-to-medium-cost air quality sensors, one reference-grade monitor that can measure PM_{10}, $PM_{2.5}$, NO_2, SO_2 and meteorological data, and five units of meteorological sensors.

Another positive outcome of the project is that it has allowed Quezon City to formally participate in the National Capital Region Airshed Board. Airsheds are areas with similar climate, meteorology and topology that affect the interchange and diffusion of pollutants in the atmosphere, and work on the basis that air quality management and control are most effective at these more local levels. Quezon City is now sharing knowledge and having ongoing discussions with Manila and other cities on best practice and equitable climate actions to reduce pollution.

Other notable accomplishments to promote better air quality and improve the life of residents include the expansion of Quezon City's cycle lane network to 161 km, which will be further expanded in 2022. To enhance walking experience and encourage the active mobility of residents, the city has opened the Green Open Reclaimed Access Lane, with a total of 5.39 kilometres of pedestrian corridors. Other climate actions include the distribution of electric tricycles and installation of solar charging stations, in barangays or local communities, initiatives made possible by Quezon City's private partners.

With so many bold actions taken, the city can be said to be well on its way to improving the lives of its residents, an aim which is clearly set out by the Honorable Mayor Ma. Josefina G. Belmonte.

Mayor of Quezon City, Josefina 'Joy' Belmonte

> *"The future we want for Quezon City is where people are well-informed and are actively participating in the campaign for clean air by shifting away from unsustainable practices in order to provide every resident with the benefits of clean air."*

QUITO

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Since signing the C40 Clean Air Cities Declaration in 2019, Quito has undertaken the first stages of roadmap development to establish baseline levels and draft ambitious reduction targets consistent with the World Health Organisation guidelines.

The air quality monitoring network currently consists of nine fixed stations with reference grade equipment in which all criteria pollutants (CO, NO_2, SO_2, O_3, PM_{10}, $PM_{2.5}$, and various meteorological parameters) are monitored. Stationary sources account for > 90% of $PM_{2.5}$ emissions, according to the 2011 emissions inventory. During 2020, the city established several policy decisions to improve air quality.

The Metropolitan Council issued a resolution urging the authorities to improve the properties of the diesel fuel distributed in Quito, and to limit the entry of vehicle technologies by setting a minimum performance.

As part of the Ordinance , currently under discussion, which encourages the use of zero-emission vehicles in the Metropolitan District of Quito, a plan has been announced to create a low-emission zone in the historic center of Quito. The area will make the historic center more attractive not only in terms of its cultural aspects as a World Heritage City, but to foster commercial and restaurant activities.

Within the framework of the Solutions Plus Project, the city will conduct a survey on the logistics needs of the sector and the interest in electric mobility services for logistic purposes. Quito will deploy a call for competitive funds for the design and manufacture of the electric vehicles for the pilot plan.

Quito has already had almost 58 km of bicycle lanes (including bidirectional, unidirectional, shared and suburban) implemented in the last 12 years. Since June 2020, nearly 17 km of additional bicycle lanes have been built. This is part of the bikeway expansion plan that aims to build 67.5 km in total. This has resulted in an increase of bicycle trips on the implemented lanes of more than 200% compared to 2019 data.

RIO DE JANEIRO

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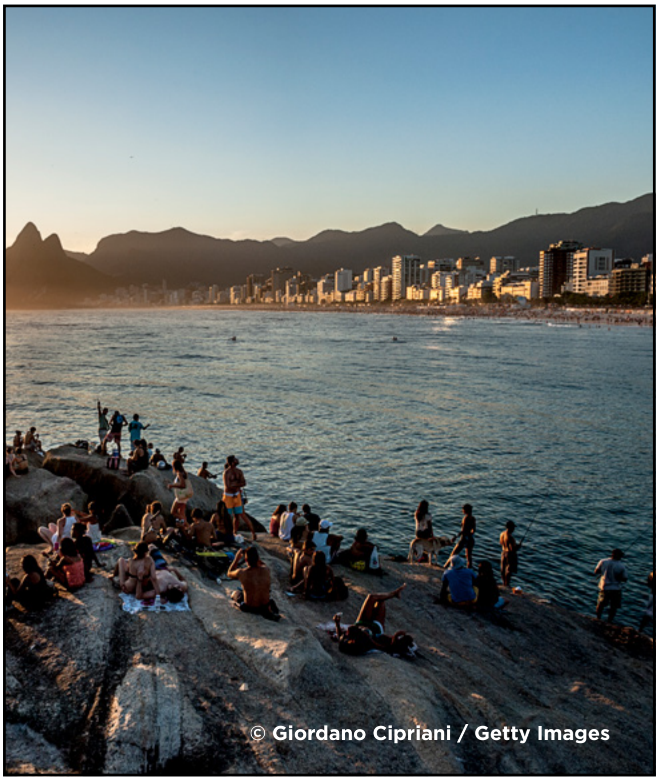
The air quality monitoring performed by Rio de Janeiro over the last ten years has allowed the city to set a reduction goal for the concentration of particulate matter in the city (PM_{10}: 30µg/m^3 by 2030). The city is preparing to form a technical team that will work with issues related to urban mobility, air quality and health.

New air quality objectives have been established in the City of Rio de Janeiro's Sustainable Development and Climate Action Plan, released by City Hall in June of 2021. The proposed goals and actions can be found here.

The city is preparing to implement the first phase of the project related to the low emission region, which is scheduled for completion in 2024. The low emission district was established in July 2021, and new air monitoring stations will be rolled out in the city centre for 2023.



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ROTTERDAM

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Since signing the C40 Clean Air Cities Declaration in 2019, Rotterdam has undertaken the first stages of roadmap development to establish baseline levels and draft ambitious reduction targets consistent with achieving World Health Organisation (WHO) guidelines.

The city has set air quality targets in the new Air Quality Policy, in alignment with the WHO Guidelines. The targets can be found here.

A few examples of city projects to reduce emissions include the low emission zone planned for 2025; and expansion of the air quality monitoring network using local measurements by citizens, with more than 600 participants.

The city has also developed a strategy for shore power in the Port of Rotterdam and is now working on realisation of shore power. The ambition is for 90% of ferries, roll-on/roll-off ships, offshore vessels and cruise liners to be supplied with shore power by 2030. For large container vessels the aim is set at 50%.

Finally, mobility is a key sector for the improvement of air quality in Rotterdam. Mobility is about more than transport from A to B. It is also about the design of the city and about finding the right balance between cyclists, pedestrians, public transport, cars and logistics traffic.

SEOUL

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Since signing the C40 Clean Air Cities Declaration in 2019, Seoul has set ambitious reduction targets for air pollutants by 2024 that meet national commitments, and has developed the Air Quality Control Action Plan (2020–2024).

As part of the plan, Seoul has set a goal to reduce $PM_{2.5}$ levels by 35% from 26 µg/m³ in 2016 to 17 µg/m³ by 2024. Seoul plans to raise these goals to 15 µg/m³ and 13 µg/m³ by 2025 and 2030 respectively, in line with national commitments. This will put the city on a path towards the World Health Organisation air quality guidelines for particulate matter.

The Seoul PM Research Institute was created for the scientific analysis of particle pollution and policy support for the city government. The Air Quality Control Action Plan (2020–2024) was based on its scientific analysis. The plan includes 58 policy measures to cut air pollutants from four areas: road mobile pollutants, non-road mobile pollutants, emissions facilities and stationary emissions. Seoul aims to cut PM_{10} by 28%, $PM_{2.5}$ by 25% and NOX by 20% from Business as usual levels by 2024, with the policy measures set out in the action plan.

The city has provided financial support for retrofits of old diesel vehicles and banned dirty old vehicles (petrol and gas vehicles manufactured before 1987 and diesel vehicles manufactured before July 2002) from entering the city. This has led to a 53% reduction of old vehicles on the road. The city has also banned dirty old machine and equipment at municipal construction sites.

Seoul now requires construction sites larger than 100,000 m² to use eco-friendly equipment. Further key successes include laws revised laws April 2020 to require installations of low-NOX boilers to curb emissions from heating; the designation of nine densely populated areas as extensive PM control areas; increased deployment of zero emission vehicles and charging infrastructure; and research is planned to be carried out to build a scientific basis for the impact of climate change on air pollution.

STOCKHOLM

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The air quality in Stockholm has improved drastically during the last 50 years, and the city is committed to continuing this positive trend.

Since signing the C40 Clean Air Cities Declaration in 2019, the city of Stockholm has managed to meet all World Health Organisation air quality guidelines except those for ozone. Now Stockholm strives to meet the national targets for air quality. Some of these targets have already been met, while others are being supported by several innovative initiatives carried out by the city and its partners.

To raise awareness and mitigate pollution, Stockholm has been working with different digital solutions. One example is dynamic traffic signals that react to real-time concentrations of NO_2, leading to smoother traffic through narrow street canyons, decreasing ‘stop and go’ traffic and travel times.

Another initiative is an air quality forecast application. Users can monitor PM_{10}, $PM_{2.5}$, NO_2, ozone and pollen levels, guiding people with asthma to know in advance when they need to take extra medication.

Stockholm has introduced a low emission zone where only Euro 5 and Euro 6 vehicles are allowed to drive, from June 2022 only allowing Euro 6+ diesel and Euro 5+ petrol.

The ongoing pandemic has led to a potential temporary decrease in traffic. The city of Stockholm is looking to maintain this and promote sustainable mobility that enables Stockholm’s high climate ambitions. As part of this, Stockholm is enabling the ongoing shift of electrification and rejuvenation of the vehicle fleet and making it easier for both the public and local businesses to drive electric. As of 2021 there are almost 1,700 public charging units in Stockholm.

The city is also partaking in the shift within its own operations. Starting in 2022, in public procurement agreements regarding waste management, the city will require providers to use 100% renewable and fossil-free fuel and vehicles powered entirely by electricity.

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SYDNEY

Sydney signed the C40 Clean Air Cities Declaration in September 2019. Since this time, it has engaged a local university partner to deploy a total of 21 low-cost environmental monitoring sensors (including 14 air quality sensors)and to develop a plan for a Breathable Sydney in response to a Lord Mayor Minute (press release from the mayor) from August 2019.

The city has also continued working with the New South Wales (NSW) state government to find suitable locations to install 1–2 reference grade ambient air quality monitoring stations in the municipal area in addition to the existing station located next to the city centre. The city has also advocated for prioritisation of high-traffic routes in the area for the state government rollout of electric buses.

The COVID-19 pandemic has significantly disrupted transportation and work patterns. This provides an opportunity to assess changes to air quality as transportation increases. The pandemic also provided an opportunity to install pop-up and permanent cycleways and pedestrianisation of a major corridor, George Street South.

In July 2021, the city of Sydney adopted its Environmental Strategy 2021–2025, which meets C40 Climate Action Plan requirements. Action 19 commits the city to finish installing its low-cost air quality sensor network and continue working with the NSW government to establish additional air quality monitoring stations across the city. The NSW government is also developing its Clean Air Strategy 2021–30, which will greatly assist Sydney in delivering against the C40 Clean Air Cities Declaration.

TEL AVIV - YAFO

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The main source of air pollutants in Tel Aviv-Yafo is transportation emissions. During 2020, Tel Aviv-Yafo municipality established a new strategic project, 'Turning the Pyramid upside down', with the goal of promoting sustainable mobility and changing the current levels of private car use from 56% (2019) to 30% (2030).

To better understand the city's air quality status, 10 low-cost sensors will be installed by the end of 2021 and 40 more will be installed by the end of 2022.

The city is in the process of increasing forms of mobility while promoting solutions for walkability. Measures include evacuating parked vehicles from sidewalks; reducing hazards and infrastructure located on sidewalks; adding trees and shading along the main walkways; widening sidewalks and crossings; arranging sidewalks around the city; improving traffic light times to benefit pedestrians and creating continuous crossings; and turning streets/roads to zero emission streets.

The city is also increasing the possibilities for cycling by paving more bicycle paths (155 km in 2020 to 300 km by 2025) and promoting bicycle hire for a subsidised price.

As of February 2020, 58 km of public transportation routes have been deployed in Tel Aviv-Yafo, with 138 km of more routes expected by 2025. In addition, the municipality is working with the Ministry of Transportation and bus companies to expand the service by adding lines and increasing their frequency. The municipality also funds public transportation during the weekends. Moreover, by the end of 2022, the first 'light train' route connecting four different cities to Tel Aviv will begin operations.

In its efforts to promote clean transportation, Tel Aviv-Yafo has installed charging stations for electric cars in public car parks and limits the number of parking spaces in new buildings. The city encourages the most polluting heavy diesel vehicles to become cleaner, utilising digital enforcement methods.

Mayor of Tel Aviv-Yafo, Ron Huldai

"Tel Aviv-Yafo aims to transform the pyramid of transportation users, and to give priority to walking, cycling, and public transportation - over private vehicles. Over the past decades we have been working tirelessly and successfully, within our authority, to reduce air pollution in the city. Promoting the City of Clean Air program, in which the municipality will electronically ensure that banned polluting vehicles do not enter the city, is part of this program. I welcome the important collaboration with the Ministry of Environmental Protection to promote this issue."

TOKYO

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Since signing the C40 Clean Air Cities Declaration in 2019, Tokyo has been actively pursuing its fulfilment.

Tokyo achieved the national environmental standard for $PM_{2.5}$ at all monitoring stations in FY 2019; for further improvement, the new target states that the annual average value for all measuring stations should be 10 µg/m^2 or less by FY 2030. To achieve this goal, the city will further develop the measures taken to date.

In addition to $PM_{2.5}$, the city also has its sights on reducing ozone, as these levels do not yet meet the national environmental standard.

For the further reduction of volatile organic compounds and nitrogen oxides, the city is advancing actions which include: the use of zero emission vehicles; voluntary efforts by businesses through the "Clear Sky Supporter Program"; an open data policy for air quality data using the latest technologies, such as 5G; and air pollution measures over a wider area in cooperation with neighbouring prefectures and cities. The city is also trying to identify the sources of volatile organic compounds that contribute significantly to the generation of ozone, to be better able to eliminate them.

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WARSAW

Warsaw has been implementing a policy to improve air quality in the city. The main areas of focus include the expansion of an air quality monitoring system with two new stations installed in 2020 In addition, the city announced a tender for a network of 165 air quality sensors. The network will cover not only Warsaw but also the 17 surrounding municipalities.

During the 3rd Clean Air Congress in February, 2020, the mayor of Warsaw, Rafał Trzaskowski, signed a declaration of cooperation between the Mazovia Voivodeship (region) and the local government to improve air quality. Actions involve tightening the provisions of the 2017 anti-smog resolution, by banning coal burning in household stoves in Warsaw from the fourth quarter of 2023. The anti-smog resolution requires the phase out of classless and low-class stoves (kopciuchów), and thanks to the Warsaw programme a total of 2,917 stoves have been phased out in 2017–2020. The city plans to eliminate all stoves in the city by the end of 2022.

By the end of 2024, the city expects to have extended the Metro system to 45.4 km. Six new stations for the 'M2' line have been built in 2019–2020. Two new stations in the 'M1' line and a third 'M' line are also planned.

Tram communication is being expanded and a fleet of buses that meet the highest emission standards is growing. The city also plans numerous new bus lanes. A P+R ('Park and Ride') car park network is being developed, with 16 P+R car parks for 4,655 cars and 808 bicycle spaces delivered in 2019 and two more planned. The P+R network allows drivers who park in those locations to take public transport for free.

The city has also extended paid parking zones and introduced restricted transport zones, with further extensions are planned. Finally, the city has developed its pedestrian and bicycle infrastructure and the Warsaw bicycle rental system ('Veturilo').

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WASHINGTON, D.C.

Since signing the C40 Clean Air Cities Declaration in 2019, the District of Columbia has established baseline air quality emissions according to its national reporting requirements and is in the process of developing ambitious reduction targets.

The District of Columbia used its long-established air quality monitoring network with six stationary stations to establish a baseline, and set air pollution targets aligned with the World Health Organisation guidelines for ambient air pollution. A baseline assessment of these pollutants can be found in the city's 2019 Air Quality Trends report.

In addition, the Department of Energy and Environment's (DOEE) Air Quality Division plans to implement a hyper-local air monitoring pilot project within the next year. While the district has a strong understanding of its ambient air concentrations, local hotspots are a concern, and while national ambient air quality standards are met for pollutants like $PM_{2.5}$, it is likely not protective of all residents. The ambient air quality network plan was submitted to US Environmental Protection Agency last year. More information can be found here.

Since signing the declaration, the district has signed on to several commitments that will measurably and substantially reduce emissions and improve air quality. DC has joined with several other states on both the Multi-State Medium- and the Heavy-Duty Zero Emission Vehicle Memorandum of Understandings.

Additionally, the district joined the Transportation & Climate Initiative Program, a multi-state programme that tackles pollution from vehicles while investing USD 300 million per year in cleaner transportation choices and healthier communities.

The mobile sources sector is responsible for approximately 25% of the district's greenhouse gas emissions, and modelling conducted by the Ozone Transport Commission has found that on-road diesel emissions are the second largest anthropogenic contributor to days that exceed ozone levels.

DOEE's Air Quality Division is also in the beginning stages of developing a proposed regulation to address environmental and public health inequities in vulnerable communities when reviewing air quality permit applications and enforcing existing air quality regulations.

C40
CITIES